

REMARKS

Review and reconsideration on the merits are requested. The applicants acknowledge their telephone interview with Examiner Leader, Dr. Taylor (the co-inventor), Patrick Baker (a patent trainee working for Dr. Taylor) and the undersigned.

Claims 1-20 and 41-43 have been withdrawn from consideration. Claims 47 and 48 are newly presented. These claims are supported by the disclosure at paragraph 0040.

The application indicates in paragraph 0031 that Fig. 9 illustrates prior art. The Figure has been amended accordingly by the accompanying Replacement Drawing.

The specification has been amended to correct editorial errors. The nature of the corrections is such that no explanation appears necessary.

The Official Action sets forth five rejections, all of which are based upon the prior art.

Claims 21, 22, 26, 32, 33 and 35 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Bonkass et al., U.S. Patent 6,974,530. In response to this rejection, the applicants have amended the independent claims to more accurately describe the flow of the electrolyte solution across the workpiece as being a uniform flow that is parallel to the major surface of the workpiece. This amendment is consistent with all of the drawings illustrating the invention, particularly, Figs. 11 and 12. It is also consistent with disclosures in the application, for example, the disclosure at paragraph 0044. The Bonkass patent teaches a method for controlling ion distribution during plating on a workpiece. The method utilizes an inlet from which plating solution is ejected. Among other things, the rejection contends that the diffuser element 111 that is situated between the anode and the substrate holder is a “dampening member” as claimed by applicants because it restrains the flow of the plating solution.

The applicants discussed this rejection with the Examiner in some detail. The applicants noted that the claims, as presented, define the function of the dampening member as being to direct the electrolyte solution flow across the surface of the workpiece. The applicants argued that the diffuser element 111 does not direct the dampening flow across the surface of the

workpiece because the direction of the electrolyte flow as it leaves the nozzle 105 and as it passes through the diffuser element 111 is essentially unchanged. However, to more clearly distinguish the invention over the Bonkass disclosure, the applicants have more specifically defined the flow in the claims as being a uniform flow parallel the surface of the workpiece. In more detail, the claims call for solution to flow from the eductors over a flow-directing surface of the dampening member so that, as it flows across the workpiece, the flow is uniform and parallel the major surface of the workpiece. Bonkass clearly teaches a flow that is perpendicular to and impinges the major surface of the workpiece. The impinging flow creates an uneven variation in solution flow velocity across the surface of the workpiece similar to the effect illustrated in Fig. 4 in the application. During the interview, the Examiner noted that, in Bonkass, upon striking the workpiece, the flow of the electrolyte solution could be considered to include a component that is parallel to the surface of the workpiece. The applicants responded that clearly the flow that the applicants are claiming is different than the flow illustrated in the Bonkass patent and to the extent that it might be argued that Bonkass includes a parallel flow component, that flow cannot be considered a uniform flow that is parallel the major surface of the workpiece. In view of this, the applicants noted that the amendment distinguishes the claims over Bonkass and, during the interview, the Examiner, without committing himself, appeared inclined to agree with applicants.

The balance of the rejections are lodged under 35 U.S.C. § 103 and rely upon the teachings of Bonkass in combination with secondary references. In each instance, the secondary reference is relied upon to teach a concept different than dampener-directed electrolyte solution flow parallel the surface of the workpiece and, as such, the secondary references do not remedy the basic distinction between the invention, as claimed, and Bonkass, as discussed above. More particularly, claim 23 is rejected under 35 U.S.C. § 103(a) over the teachings of Bonkass in view of Wang et al., U.S. Patent 6,610,89[sic]. Wang is cited as teaching an electroplating cell in which the substrate is vibrated. Claims 24 and 25 are rejected over Bonkass in view of admitted prior art. The admitted prior art is the concept of moving the workpiece left to right to improve the uniformity of flow. Without agreeing with the statement in the rejection that the flow is oscillatory and/or known, the applicants traverse the rejection because the admitted art does not address the dampener-directed parallel flow discussed above. Finally, claims 27-31, 34, 38-40

and 44-46 are rejected over the teachings of Bonkass in view of Wilson et al., U.S. Published Application 2005/0178667. The Wilson et al. reference is cited with respect to the size of the workpiece and the distance between the anode and the workpiece and the inclusion of a baffle or shield over the anode elements. Wilson does not teach the use of a dampening member to provide parallel flow, as claimed. Finally, claims 36 and 37 are rejected over Bonkass in view of the Lowenheim text "Electroplating." Lowenheim is cited as teaching that anode bags are known in the art. The applicants do not disagree that anode bags are known in the art, however, the porous cloth that is recited in claims 16, 17, 36 and 37, for example, is not part of an anode bag. To the contrary, the anode elements used in the present invention may be contained in conventional anode bags for the well accepted purpose of retaining anode sludge. The porous member employed in this embodiment of the present invention is a member that extends the length of the anode chamber and, as explained at paragraph 0041 of the specification, functions to spread the current distribution between the anode and the workpiece such that the chamber in its entirety acts as a virtual anode, as contrasted with individual anodes.

In view of the foregoing, the applicants submit that the rejections set forth in the Official Action of March 23, 2007, should be withdrawn.

During the interview, the applicants directed the Examiner's attention to U.S. Patent 6,048,584 to Josefowicz. In discussing this reference, the applicants noted and the Examiner agreed that Josefowicz does not teach the solution flow dampening member that is used in the claimed invention. Josefowicz illustrates ejectors that supply fluid to a plating cell in a circuitous pass that flows generally, but not entirely, parallel to the surface of the workpieces. More specifically, the solution flow from the nozzles in the Josefowicz patent has a significant component that is not parallel to the surface of the workpiece. During the interview, the Examiner referred to a conventional garden hose nozzle and the fanned spray that is emitted from that nozzle. Because the Josefowicz nozzles are not used in conjunction with solution flow dampeners, the flow includes a significant component that impinges the surface of the workpieces at an angle and is not parallel to the surface of the workpieces. As a result, the Josefowicz system does not enjoy the benefits of the thin barrier layer that is achievable with the

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Amendment

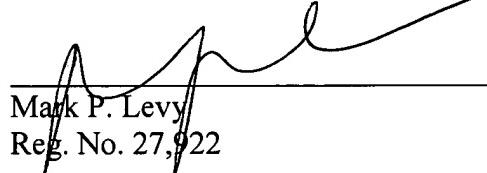
present invention by using a dampener that directs the solution flow from the nozzle into a uniform flow parallel the major surface of the workpieces.

During the interview, without binding himself, the Examiner appeared to indicate that the amendments that are proposed herein wherein the geometry of the solution flow over the dampener and parallel to the major surface of the workpiece would make the claims patentable over Josefowicz. The Examiner indicated that he would do additional searching relative to this aspect of the invention. The applicants submit that in the absence of more relevant art, the invention, as claimed, is not obvious from the teachings of Josefowicz, and the applicants respectfully request favorable action on the merits.

In the event the Examiner wishes to discuss any aspect of this response, he is invited to contact the undersigned at the telephone number indicated below.

The Commissioner is hereby authorized to charge any additional fees required, including the fee for an extension of time, or to credit any overpayment to Deposit Account 20-0809. The applicant(s) hereby authorizes the Commissioner under 37 C.F.R. §1.136(a)(3) to treat any paper that is filed in this application which requires an extension of time as incorporating a request for such an extension.

Respectfully submitted,



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